

Small-Scale Farmer Preferences: Exploring the Gap Towards Product Attributes of Local and Imported Fertilizers

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Abstract—Marketing program becomes a crucial matter for fertilizer industries to boost selling in a particular marketplace. Local fertilizer industries actors are tried to outperform the competitor from other countries. The research objective is to explore horticulture small-scale farmer preference for product attributes of local and imported fertilizer. The research was conducted in Java, Indonesia as a representative region of horticultural farmers. This study used a survey method to gather data from 513 small-scale farmers horticultural farmers which spread over four provinces in Java Island. The data were analyzed with MANOVA analysis. The result shows that farmers have a similar preference for local and imported fertilizers concerning price, promotion, and nutrient content. Farmers prefer price between IDR 16,000 to IDR 20,000 per kg, promotion through farm demonstration plot, and product content additional micro-nutrients and vitamins. On the other hand, there is a distinct preference for the design of fertilizer packaging. Farmers prefer imported fertilizer with an additional image, but not on local fertilizers. This finding serves as a reference to fertilizer producers in improving their marketing strategy. Local fertilizers producers should undertake a strategy adjusted to farmer preferences to win the competition in local market. This research only represents the behavior on the small-scale farmers, the result might be different if it apply in a large-scale farmer because this type of farmer has different characteristic which will influence to their preference of fertilizer.

Keywords— customer preference; marketing strategy; fertilizer; small-scale farmer.

I. INTRODUCTION

Today the transformation of agricultural system in developing countries is greatly fast. Due to the development of agricultural system, farmers become selective to buy agricultural-input products, e.g. seeds, fertilizers, pesticides and supporting cultivation machinery [1]. Besides that, consumers use various information processing strategies to consider products and to reach their decisions [2]. Product attribute determination process will bring the successful prediction of customer purchase [3]. Producer countries and product quality of available product categories significantly affect consumer decision making [4].

In Indonesia, small-scale farmers as consumers fulfill their need from local and imported product. Considering that fertilizer becomes compete for the product in the global industry. Indonesian fertilizer producers compete with other countries producers as strong competitors in order to win the market. Therefore, effective marketing strategies are one of crucial functions in fertilizer organization management [5].

It is important to explore small-scale horticultural farmers preferences for product attribute of local and imported fertilizers in Java Island, Indonesia as a production center of the horticultural commodity in Indonesia.

Fertilizers are an essential element in the cultivation activities to improve plant productivity. Farming sustainability can be carried out by maintaining or increasing soil [5]. Most farmers use fertilizers in farming activities as nutrient supplement for soil and plants [7]. Because of the importance of fertilizer, farmer must choose the appropriate fertilizer to improve their farming result.

There are different evaluations of imported products with similar domestic products [8]. Globalization and free trade in the economic situation give a high impact and all at once hamper for local fertilizer industries. In line with that condition, fertilizer consumers in developing countries have many preferences to decide in purchasing fertilizer. Consumer preferences depend on the subjective perspective and taste as measured by the utility of various goods [9].

The underlying foundation of fertilizer demand is a model of how consumer have. The consumer's wants are unlimited

and outpace customer ability to satisfy them all. Consumer preference gives a positive influence on product consumption behaviour [10]. Recently, farmers as fertilizer customers prefer to purchase a better quality of fertilizer rather than to consider the price [11]. Moreover, farmers become selective to use fertilizer while considering of nutrient content and primary ingredient of fertilizer [12]. Price, brand status, product labelling, and nutrient determine customer purchasing preferences for fertilizer [13]. Brand and packaging are representative of product quality that creates customer value [14]. Product labelling as a packaging elements is an important part because some consumer perceive packaging as a visual aestechics [15]. The emerging farmers' fertilizer purchase decision is strongly influenced by service, brand, product, and learning or psychological factors [5]. One way to learn about the fertilizer is through demonstration plot, as a promotional medium from the fertilizer company.

According to Statistics in Indonesia in the last eleven years of 2007 – 2017, the average consumption of imported fertilizers in Indonesia was over 40.51%. On the other hand, the market size of fertilizer in 2017 was up to 3.1 million tons or rose 6.24% from 2016 [16]. It is described that fertilizer consumption tends to increase year by year considering several factors (such as climate change, type of farmland, nutrient needs per plant, etc.). The use of fertilizer in Asia dramatically increases due to the environment condition; fertilizer is considered capable of controlling weeds, pests and diseases, and optimum utilization of soil moisture from rainfall and irrigation. Fertilizer subsidies regarding the government policies have taken a roll in the fertilizer marketplace [17]. These, successively, have spurred a re-evaluation of fertilizer companies, in particular local fertilizer companies to escalate the competitiveness in the marketplace.

There are rare researches about customer preference for fertilizers. The previous research discuss fertilizer as a general without consider the location of fertilizer producer in terms of geographical area such as producer from local and other countries. In addition, there are no research discuss about the behavior of farmer fertilizer preference in terms of business size, to be more specific in small holders. Therefore, it is important to conduct a study about small-scale farmer preferences for the local and imported fertilizers in Indonesia. In this research, consumer preference for fertilizer product attribute is examined by price, promotion, nutrient content and design of the packaging. This research gives an overview about farmer behavior in particular their preference for fertilizer. It may used as reference for fertilizer producer to decide marketing strategy in particular attribute product. In addition, it contribute to the agricultural marketing knowledge to understand the behavior of farmer specifically in small-scale farmer.

II. MATERIAL AND METHOD

This research is based on horticultural farmer's preference for using fertilizers at a horticulture production center in Java Island of Indonesia covering West Java province, Central Java Province, East Java province and Banten Province. The target sample of the survey was selected using cluster sampling technique. The sample size in this study

was 513 respondents which spread over four provinces in Java Island who were small-scale horticultural farmers that used local and imported fertilizers frequently. Data were collected through survey method using a questionnaire with multiple choice questions. The questions were about the customer preferences for fertilizer attribute product in terms of price [11], [13] promotion through demonstration plot where farmers could learn [5], nutrient [5], [12], [13], and design of packaging [15]. Price attribute was examined by the amount of money that farmers were willing to pay for the product. Promotion was determined by the type of promotion preferred by the consumer to ensure trust and the knowledge of the product such as land for demonstration, farmer training, farmer assistance, and free sample products. Nutrient content is the material contained in the fertilizer. Design of packaging was examined by design of packaging that farmers preferred.

In this research, customer preference is the dependent variable in quantitative data. Customer preference is divided into two categories namely customer preference for local and imported fertilizers. MANOVA analysis test examines the significance of the mean of two different groups [18]. MANOVA test procedures are as follows:

A. *The two different groups are significantly different from several independent variables.*

Significance test shows centroid difference between the two groups with multivariate significance test. Hypotheses are as follows:

$$H_0 : \begin{pmatrix} \mu_{1_1} \\ \mu_{2_1} \\ \mu_{3_1} \\ \mu_{4_1} \end{pmatrix} = \begin{pmatrix} \mu_{1_2} \\ \mu_{2_2} \\ \mu_{3_2} \\ \mu_{4_2} \end{pmatrix} \quad H_1 : \begin{pmatrix} \mu_{1_1} \\ \mu_{2_1} \\ \mu_{3_1} \\ \mu_{4_1} \end{pmatrix} \neq \begin{pmatrix} \mu_{1_2} \\ \mu_{2_2} \\ \mu_{3_2} \\ \mu_{4_2} \end{pmatrix} \quad (1)$$

B. *Multivariate Significance Test*

The test is to know the difference of two groups' centroid that can be evaluated with (1) Pillai's Trace; (2) Hotelling's Trace; (3) Wilks' Lambda; and (4) Roy's Largest Root. Afterward, the forth-multivariate statistics test is transformed into F-ratio test.

$$\text{Pillai's Trace} \quad \sum_i^k = 1 \frac{\lambda_i}{1+\lambda_i} \quad (2)$$

$$\text{Hotelling's Trace} \quad \sum_i^k = 1 (\lambda_i) \quad (3)$$

$$\text{Wilks Lambda} \quad \prod_i^k = 1 \frac{1}{1+\lambda_i} \quad (4)$$

$$\text{Roy's Largest Root} \quad \frac{\lambda_{max}}{1+\lambda_{max}} \quad (5)$$

C. *Effect Size*

Effect size is used to determine whether any significance mean or group of centroid with Partial Eta Squares (PES) has differences in size.

$$\text{PES} = 1 - \Lambda = 1 - \frac{SS_b}{SS_t} = \frac{SS_b}{SS_t} \quad (6)$$

where SS_b = sum of squares between group, SS_w = sum of squares within group and SS_t = sum of squares total.

D. Interaction test

As the study has three independent variables, it means it has three main effects. With these three main effects, then it should run several tests. The first is the main effect test. The second is the main effect interaction test to recognize how each independent variable simultaneously influences the dependent variable.

III. RESULTS AND DISCUSSION

Farmers using fertilizers had different backgrounds in terms of age, sex, education and business governance as a farmer group. Table 1 shows the characteristics of farmer respondents. 76 percent of farmers were in the middle age. Almost all the farmers were male. Only 3.5 percent of farmers completed their bachelor and diploma degree and 92.8 % had gone to elementary, junior and high school. Almost three quarter of farmers had no informal education. Less than 30 percent of farmers had an informal education in the form of training of cultivation, harvest and post harvest handling.

TABLE I
RESPONDENT CHARACTERISTICS

Charcteristics	n	Percentage (%)
Age		
Young Adult (20-29)	19	3.7
Adult (30-39)	68	13.3
Middle Age (40-60)	390	76.0
Senior Age (More Than 61)	36	7.0
Sex		
Male	501	97.7
Female	12	2.3
Formal Education		
None	19	3.7
Elementary School	243	47.4
Junior High School	129	25.1
Senior High School	104	20.3
Diploma	6	1.2
Bachelor	12	2.3
Informal Education		
None	370	72.1
Training	143	27.9

TABLE II
MULTIVARIATE TESTS^A

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.744	671.703 ^b	2.000	463.000	.000	.744
	Wilks' Lambda	.256	671.703 ^b	2.000	463.000	.000	.744
	Hotelling's Trace	2.902	671.703 ^b	2.000	463.000	.000	.744
	Roy's Largest Root	2.902	671.703 ^b	2.000	463.000	.000	.744

There are various types of fertilizer that are commonly used in Indonesia, such as Urea, NPK, ZA, phosphate/SP-36, K₂SO₄/ZK and organic fertilizer. Consumer preference is built by customer perspective of attribute products. Four attribute factors were analyzed as an indicator to measure consumer preference for fertilizer. Four attributes fertilizer used in this study are price, promotion, nutrient content and design of the packaging.

A. Multivariate Normality Test

The use of Box's test is to examine the multivariate normality test. The analysis showed significance result, which indicates the covariance matrix of dependent variables, where price, promotin, the design of packaging, and nutrient content are not the same. It explains that the multivariate normality assumption is not fulfilled. However, it should be taken into account that Box's M test is very sensitive in terms of normality test violence. Multivariate analysis is robust; this means examination can be continued.

TABLE II
BOX'S TEST OF EQUALITY OF COVARIANCE MATRICES^A

Box's M	187.684
F	2.244
df1	69
df2	2486.895
Sig.	.000

Bartlett's Test of Sphericity is used to show correlation test among the dependent variables. Bartlett's test shows a significant result that indicates the existence of correlation presents adequate evidence among observed independent variables, namely customer preference for local and imported fertilizers.

TABLE III
BARTLETT'S TEST OF SPHERICITY^A

Likelihood Ratio	.000
Approx. Chi-Square	830.968
df	2
Sig.	.000

B. Multivariate Significance Test

This study uses four types of statistical tests to know the difference between two groups of centroid, namely Pillai's Trade, Wilks Lambda, Hotelling's Trace and Roy's Largest Root. The results of these four statistic tests are transformed into F-test.

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Price	Pillai's Trace	.036	2.148	8.000	928.000	.029	.018
	Wilks' Lambda	.964	2.157 ^b	8.000	926.000	.029	.018
	Hotelling's Trace	.037	2.166	8.000	924.000	.028	.018
	Roy's Largest Root	.034	3.963 ^c	4.000	464.000	.004	.033
Promotion	Pillai's Trace	.056	4.428	6.000	928.000	.000	.028
	Wilks' Lambda	.945	4.468 ^b	6.000	926.000	.000	.028
	Hotelling's Trace	.059	4.508	6.000	924.000	.000	.028
	Roy's Largest Root	.055	8.524 ^c	3.000	464.000	.000	.052
Nutrient Content	Pillai's Trace	.061	4.861	6.000	928.000	.000	.030
	Wilks' Lambda	.940	4.861 ^b	6.000	926.000	.000	.031
	Hotelling's Trace	.063	4.861	6.000	924.000	.000	.031
	Roy's Largest Root	.043	6.706 ^c	3.000	464.000	.000	.042
Design of Packaging	Pillai's Trace	.017	3.904 ^b	2.000	463.000	.021	.017
	Wilks' Lambda	.983	3.904 ^b	2.000	463.000	.021	.017
	Hotelling's Trace	.017	3.904 ^b	2.000	463.000	.021	.017
	Roy's Largest Root	.017	3.904 ^b	2.000	463.000	.021	.017
Price * Promotion	Pillai's Trace	.016	.742	10.000	928.000	.685	.008
	Wilks' Lambda	.984	.741 ^b	10.000	926.000	.686	.008
	Hotelling's Trace	.016	.740	10.000	924.000	.687	.008
	Roy's Largest Root	.012	1.091 ^c	5.000	464.000	.365	.012
Price * Nutrient Content	Pillai's Trace	.010	.607	8.000	928.000	.773	.005
	Wilks' Lambda	.990	.606 ^b	8.000	926.000	.773	.005
	Hotelling's Trace	.010	.605	8.000	924.000	.774	.005
	Roy's Largest Root	.008	.985 ^c	4.000	464.000	.415	.008
Price * Design of Packaging	Pillai's Trace	.017	2.039	4.000	928.000	.087	.009
	Wilks' Lambda	.983	2.041 ^b	4.000	926.000	.087	.009
	Hotelling's Trace	.018	2.043	4.000	924.000	.086	.009
	Roy's Largest Root	.016	3.736 ^c	2.000	464.000	.025	.016
Promotion * Nutrient Content	Pillai's Trace	.066	1.747	18.000	928.000	.027	.033
	Wilks' Lambda	.935	1.744 ^b	18.000	926.000	.028	.033
	Hotelling's Trace	.068	1.742	18.000	924.000	.028	.033
	Roy's Largest Root	.042	2.165 ^c	9.000	464.000	.023	.040
Promotion * Design of Packaging	Pillai's Trace	.042	3.345	6.000	928.000	.003	.021
	Wilks' Lambda	.958	3.357 ^b	6.000	926.000	.003	.021
	Hotelling's Trace	.044	3.369	6.000	924.000	.003	.021
	Roy's Largest Root	.038	5.837 ^c	3.000	464.000	.001	.036
Nutrient Content * Design of Packaging	Pillai's Trace	.039	4.578	4.000	928.000	.001	.019
	Wilks' Lambda	.961	4.612 ^b	4.000	926.000	.001	.020
	Hotelling's Trace	.040	4.646	4.000	924.000	.001	.020
	Roy's Largest Root	.040	9.226 ^c	2.000	464.000	.000	.038
Price * Promotion * Nutrient Content	Pillai's Trace	.007	.870	4.000	928.000	.482	.004
	Wilks' Lambda	.993	.869 ^b	4.000	926.000	.482	.004
	Hotelling's Trace	.008	.868	4.000	924.000	.483	.004
	Roy's Largest Root	.007	1.558 ^c	2.000	464.000	.212	.007
Price * Promotion * Design of Packaging	Pillai's Trace	.000	. ^b	.000	.000	.	.
	Wilks' Lambda	1.000	. ^b	.000	463.500	.	.
	Hotelling's Trace	.000	. ^b	.000	2.000	.	.
	Roy's Largest Root	.000	.000 ^b	2.000	462.000	1.000	.000
Price * Nutrient Content * Design of Packaging	Pillai's Trace	.000	.036 ^b	2.000	463.000	.965	.000
	Wilks' Lambda	1.000	.036 ^b	2.000	463.000	.965	.000
	Hotelling's Trace	.000	.036 ^b	2.000	463.000	.965	.000
	Roy's Largest Root	.000	.036 ^b	2.000	463.000	.965	.000
Promotion * Nutrient Content * Design of Packaging	Pillai's Trace	.012	.548	10.000	928.000	.857	.006
	Wilks' Lambda	.988	.548 ^b	10.000	926.000	.856	.006
	Hotelling's Trace	.012	.549	10.000	924.000	.856	.006
	Roy's Largest Root	.012	1.093 ^c	5.000	464.000	.363	.012
Price * Promotion * Nutrient Content * Design of Packaging	Pillai's Trace	.000	. ^b	.000	.000	.	.
	Wilks' Lambda	1.000	. ^b	.000	463.500	.	.
	Hotelling's Trace	.000	. ^b	.000	2.000	.	.
	Roy's Largest Root	.000	.000 ^b	2.000	462.000	1.000	.000

The statistic analysis is an upper bound on F that yields a lower bound on the significance level. Multivariate significance test showed fifteen different centroids based on tests of Pillai's Trace, Wilks Lambda, Hotteling's Trace and Roy's Largest Root. Based on F-test with 95 per cent level of significance, the result of the four factors of price, promotion, nutrient content and design of packaging was not equal to zero, and there was a difference between the four marketing programs of fertilizer products. The result of significance of F-test using the four test on multivariate analysis revealed significant test results on price, promotion, nutrient content, design of packaging, interaction between price and design of packaging, interaction between promotion and nutrient content, interaction between promotion and design of packaging, and interaction between nutrient content and design of packaging. In MANOVA Test with more than one independent variable, there were fifteen main effect tests with four independent variables consisting of price, promotion, nutrient content, the design of packaging and eleven interaction tests among the four independent variables. It shows that price, promotion, nutrient content and design of packaging influence farmer preference for marketing program used both by local and imported fertilizers.

Moreover, price, promotion, nutrient content and design of packaging simultaneously influence farmer attitude to marketing program of fertilizer product. Partial Eta Squared (PES) based on roy's largest root, show a promotion factor has the highest total variance with 5.2% of the total variance and design of packaging factor has the lowest factor with 1.7% of the total variance. The multivariate test has a powerful influence on rejecting the null hypothesis of the study and gives a conclusion on the existence on an influence of price, promotion, nutrient content and design of packaging on

farmer marketing preference for fertilizer product they use for their horticultural business farm.

C. Significance Test of Variance Error

Variance test for error is shown by Levene's test. The test shows significance result that indicates a non-equal error on variance farmer preference for local fertilizer as well as farmer preference for imported fertilizer.

TABLE V
LEVENE'S TEST OF EQUALITY OF ERROR VARIANCES^a

	F	df1	df2	Sig.
Farmer Preference for Local Fertilizer	2.793	48	464	.000
Farmer Preference for Imported Fertilizer	2.734	48	464	.000

D. Univariate Significant Test

F-test statistic is used to represent significant univariate test. The study showed that by $\alpha=5\%$, the only main effect of price, promotion, nutrient content, and promotion and design of packaging were significant. Others factors i.e. design of packaging were not significant whether for an individual factor of a design of packaging and interaction simultaneous among factors. It can be interpreted that factors of price, promotion and design of packaging influence both farmer attitude to local fertilizers and imported fertilizers and only promotion and design of packaging influence both farmer preference for local fertilizers and imported fertilizers. The highest score for Partial Eta Squared was for promotion of farmer preference for local fertilizer (0.046), while other cases showed the lower score.

TABLE VI
TESTS OF BETWEEN-SUBJECTS EFFECTS

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Farmer Attitude to Local Fertilizer	3726.793 ^a	48	77.642	4.095	.000	.298
	Farmer Attitude to Imported Fertilizer	3574.346 ^b	48	74.466	3.363	.000	.258
Intercept	Farmer Attitude to Local Fertilizer	23896.809	1	23896.809	1260.454	.000	.731
	Farmer Attitude to Imported Fertilizer	28998.013	1	28998.013	1309.581	.000	.738
Price	Farmer Attitude to Local Fertilizer	300.480	4	75.120	3.962	.004	.033
	Farmer Attitude to Imported Fertilizer	300.574	4	75.143	3.394	.009	.028
Promotion	Farmer Attitude to Local Fertilizer	428.685	3	142.895	7.537	.000	.046
	Farmer Attitude to Imported Fertilizer	303.511	3	101.170	4.569	.004	.029
Nutrient Content	Farmer Attitude to Local Fertilizer	376.690	3	125.563	6.623	.000	.041
	Farmer Attitude to Imported Fertilizer	428.230	3	142.743	6.446	.000	.040
Design of Packaging	Farmer Attitude to Local Fertilizer	30.218	1	30.218	1.594	.207	.003

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
	Farmer Attitude to Imported Fertilizer	.383	1	.383	.017	.895	.000
Price * Promotion	Farmer Attitude to Local Fertilizer	58.943	5	11.789	.622	.683	.007
	Farmer Attitude to Imported Fertilizer	46.428	5	9.286	.419	.835	.004
Price * Nutrient Content	Farmer Attitude to Local Fertilizer	73.550	4	18.388	.970	.424	.008
	Farmer Attitude to Imported Fertilizer	68.270	4	17.067	.771	.545	.007
Price * Design of Packaging	Farmer Attitude to Local Fertilizer	130.250	2	65.125	3.435	.033	.015
	Farmer Attitude to Imported Fertilizer	99.890	2	49.945	2.256	.106	.010
Promotion * Nutrient Content	Farmer Attitude to Local Fertilizer	340.188	9	37.799	1.994	.038	.037
	Farmer Attitude to Imported Fertilizer	331.144	9	36.794	1.662	.096	.031
Promotion * Design of Packaging	Farmer Attitude to Local Fertilizer	290.219	3	96.740	5.103	.002	.032
	Farmer Attitude to Imported Fertilizer	213.993	3	71.331	3.221	.023	.020
Nutrient Content * Design of Packaging	Farmer Attitude to Local Fertilizer	203.449	2	101.724	5.366	.005	.023
	Farmer Attitude to Imported Fertilizer	78.340	2	39.170	1.769	.172	.008
Price * Promotion * Nutrient Content	Farmer Attitude to Local Fertilizer	57.118	2	28.559	1.506	.223	.006
	Farmer Attitude to Imported Fertilizer	48.652	2	24.326	1.099	.334	.005
Price * Promotion * Design of Packaging	Farmer Attitude to Local Fertilizer	.000	0	.	.	.	.000
	Farmer Attitude to Imported Fertilizer	.000	0	.	.	.	.000
Price * Nutrient Content * Design of Packaging	Farmer Attitude to Local Fertilizer	.786	1	.786	.041	.839	.000
	Farmer Attitude to Imported Fertilizer	.295	1	.295	.013	.908	.000
Promotion * Nutrient Content * Design of Packaging	Farmer Attitude to Local Fertilizer	37.619	5	7.524	.397	.851	.004
	Farmer Attitude to Imported Fertilizer	6.670	5	1.334	.060	.998	.001
Price * Promotion * Nutrient Content * Design of Packaging	Farmer Attitude to Local Fertilizer	.000	0	.	.	.	.000
	Farmer Attitude to Imported Fertilizer	.000	0	.	.	.	.000
Error	Farmer Attitude to Local Fertilizer	8796.926	464	18.959			
	Farmer Attitude to Imported Fertilizer	10274.336	464	22.143			
Total	Farmer Attitude to Local Fertilizer	494236.000	513				
	Farmer Attitude to Imported Fertilizer	608646.000	513				
Corrected Total	Farmer Attitude to Local Fertilizer	12523.719	512				
	Farmer Attitude to Imported Fertilizer	13848.682	512				

E. Contribution of Each Factor

TABLE VII
PRICE FACTOR

Dependent Variable	Price per Kg	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Farmer Attitude to Local Fertilizer	IDR 4,000 – IDR 9,000	31.042 ^a	.516	30.027	32.056
	IDR 9,000 – IDR 11,000	28.164 ^a	.890	26.415	29.913
	IDR 11,000 – IDR 15,000	31.600 ^a	1.742	28.177	35.023
	IDR 16,000 – IDR 20,000	33.000 ^a	4.354	24.444	41.556
	>IDR 20,000	23.833 ^a	2.295	19.324	28.343
Farmer Attitude to Imported Fertilizer	IDR 4,000 – IDR 9,000	33.712 ^a	.558	32.615	34.808
	IDR 9,000 – IDR 11,000	30.968 ^a	.962	29.078	32.859
	IDR 11,000 – IDR 15,000	35.400 ^a	1.882	31.701	39.099
	IDR 16,000 – IDR 20,000	37.000 ^a	4.706	27.753	46.247
	>IDR 20,000	26.833 ^a	2.480	21.960	31.707

The results of Estimated Marginal Means show the details of the influence of each factor. In the case of price factor, the price ranging between IDR 16,000 to IDR 20,000 per kg showed the highest influence both on farmer preference for local fertilizer (mean = 33.000) and farmer preference for imported fertilizer (mean = 37.000), compared to the

influence of other price range both on farmer attitude to local fertilizers and imported fertilizers. It implies that fertilizer products with a price range of IDR 16,000 to IDR 20,000 per kg will possibly give more significant change on how farmers as fertilizer product customers believe on product and compare it to the fertilizer product performance.

TABLE VIII
PROMOTION FACTORS

Dependent Variable	Promotion	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Farmer Preference for Local Fertilizer	Farm Demonstration Plot	31.778 ^a	.683	30.436	33.120
	Farmer Training	31.967 ^a	1.069	29.866	34.068
	Farmer Assistance	26.275 ^a	.889	24.528	28.022
	Free Product Sample	29.476 ^a	1.041	27.430	31.522
Farmer Preference for Imported Fertilizer	Farm Demonstration Plot	34.390 ^a	.738	32.940	35.840
	Farmer Training	34.396 ^a	1.155	32.125	36.666
	Farmer Assistance	29.429 ^a	.961	27.541	31.317
	Free Product Sample	32.904 ^a	1.125	30.692	35.115

Estimated Marginal Means related to the second factor promotion revealed promotion by giving training to the farmers is the most influential way of fertilizer product promotion on both farmer preference for local fertilizers (mean = 31.967) and farmer preference for imported fertilizers (mean = 34.396). However, the promotional medium with farm demonstration plot slightly showed the same level of influence on farmer preference for local

fertilizers and imported fertilizers. In other words, other promotional media such as farmer assistance and free product samples give lower influence on farmer preference both for local and imported fertilizers. Farmers will possibly have higher trust in fertilizer product performance through a promotional media of farmer training and farm demonstration plot.

TABLE IX
NUTRIENT CONTENT FACTORS

Dependent Variable	Nutrient Content	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Farmer Preference for Local Fertilizer	Local fertilizer nutrient with addition of micro plant nutrient and plant vitamin	28.744 ^a	.942	26.893	30.595
	Local fertilizer plant nutrient	27.778 ^a	.977	25.858	29.698
	Imported fertilizer nutrient with addition of micro plant nutrient and plant vitamin	31.973 ^a	.698	30.601	33.345
	Imported fertilizer plant nutrient	29.032 ^a	.867	27.329	30.735
Farmer Preference for Imported Fertilizer	Local fertilizer nutrient content with addition of micro plant nutrient and plant vitamin	31.645 ^a	1.018	29.644	33.646

Dependent Variable	Nutrient Content	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
	Local fertilizer plant nutrient	30.611 ^a	1.056	28.536	32.686
	Imported fertilizer nutrient with addition of micro plant nutrient and plant vitamin	34.458 ^a	.755	32.975	35.941
	Imported fertilizer plant nutrient	32.374 ^a	.936	30.533	34.214

The third factor, namely farmer preference for fertilizer nutrient content, shows that imported fertilizers with addition of plant micronutrient plant vitamin give higher influence on farmer marketing attitude to both local fertilizers (mean = 31.973) and imported fertilizers (mean

34.458). This shows that fertilizer products with nutrient content in imported fertilizer products give a higher contribution to farmer marketing behavior related to farmer assessment to buy both local or imported fertilizer.

TABLE X
DESIGN OF PACKAGING FACTOR

Dependent Variable	Design of Packaging	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Farmer Preference for Local Fertilizer	Packaging with additional image design	29.823 ^a	.463	28.914	30.732
	Packaging without additional image design	30.142 ^a	.932	28.310	31.974
Farmer Preference for Imported Fertilizer	Packaging with additional image design	33.314 ^a	.500	32.332	34.297
	Packaging without additional image design	31.838 ^a	1.008	29.858	33.818

The last factor, namely farmer preference for the design of packaging, shows that fertilizer product packaging without additional image tends to give a higher contribution on farmer preference for local fertilizers (mean = 30.142). Meanwhile, farmer preference for imported fertilizer shows a different result, as preference for fertilizer product packaging with additional image design gives a higher contribution on farmer preference for choosing imported fertilizer (mean = 33.314). These mean that what attracts customer in fertilizer products related to product attributes in the design of packaging is distinct between local and imported fertilizers. Local fertilizer products without additional image design can change farmer-marketing behavior more easily on choosing local fertilizers, while on the contrary imported fertilizers with additional design on packaging tend to easily move farmers' attitude and effect on imported fertilizer product choice.

F. Discussion

Marketing strategy becomes a key factor to improve the decision related to market segment and market targets. It is used to determine recent situation to find a new market space in the global competition. This study describes that four observed product attributes on farmer preferences for marketing program of fertilizer could influence the fertilizer marketplace.

Firstly, the price has taken a role as an important factor in global competition. The price has a direct influence on consumer perception of buying a fertilizer [19]. Price becomes a significant attribute to increase marketplace and becomes a sensitive factor in consumer preference for local and imported fertilizers. Fertilizer price range of IDR 16,000 to IDR 20,000 per kg is the farmer preference for

both local and imported ones. The farmer does not prefer to buy the lowest price, but they see the price to represent fertilizer quality. The farmer does not buy the cheapest fertilizer price, therefore, the strategy is not to set the lowest price among the competition [5]. In addition, customer is likely willing to buy a premium price sustainable fertilizer [20].

Secondly, fertilizer promotion would be highly effective if industries conduct farm demonstration plot for local and imported fertilizers. In addition, promotion through farmer training would be effective. The farmer prefers to be approached through training and demonstration plot. Farmer agricultural input adoption can be done through participatory and training extension system [21].

Thirdly, the nutrient contained in the local and imported fertilizer is significantly important along with additional micro-nutrient content and plant vitamin. Fertilizer industries (specifically local fertilizer industry) should increase the nutrient content of fertilizer products as a marketing strategy to grasp competitiveness and robust market strategy[12].

Fourthly, the design of the packaging is the only one factor that has differences between local and imported fertilizers. The farmer prefers local fertilizer product packaging without an additional image. Information such as text from the label and brand on the packaging has fulfilled farmer information searching. On the other hand, the farmer prefers imported fertilizer product packaging with an additional image. The design of the packaging is playing a role in the marketing strategy to self-appeal, providing product information, brand image and awareness [22]. Therefore, the producer should provide the packaging appearance that adjusted with consumer preference.

IV. CONCLUSION

The result of this study gives some insight about horticultural farmers preference for fertilizers in Java island, Indonesia. It can represent how the behavior of small-scale farmers in Asia reacts to the local and imported fertilizers. There is distinction of farmer preferences for local and imported fertilizers in terms of design packaging. However, in terms of price, promotion, and nutrition, the farmer preference is similar to both fertilizer sources. This finding serves as a reference to companies in improving their strategy to win the competition. Local fertilizer companies should provide fertilizer with a price range of IDR 16,000 to IDR 20,000 per kg, promoting through farm demonstration plot, addition of micro-nutrient content and plant vitamin, and simple design without images.

Future research should focus on preference at a bigger scale of the farmers because this research only represents the behavior on the small-scale farmers spread over Java Island. The research result might be different if it apply in a large-scale farmer (such as a commercial farming or a company) because this type of farmer has different characteristic with small-scale farmer which will influence to their preference of fertilizer.

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